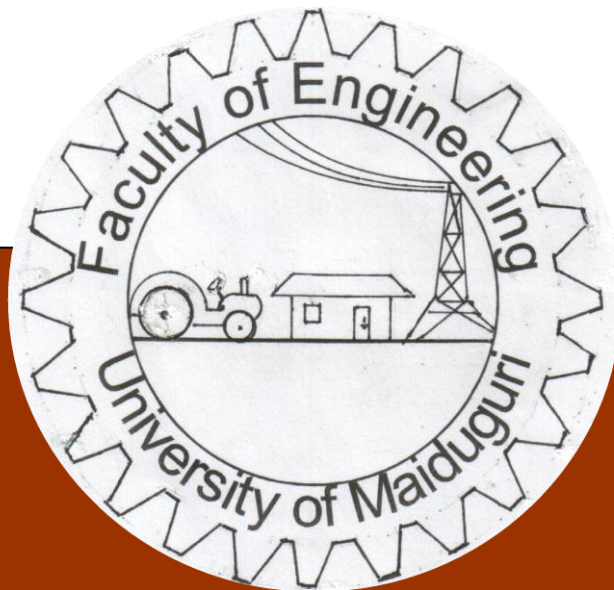


Print ISSN 1596-2490  
Online ISSN 2545-5818

# Arid Zone Journal of Engineering, Technology and Environment

Volume 13 Number 6, December 2017

**Published by**



# ARID ZONE JOURNAL OF ENGINEERING, TECHNOLOGY AND ENVIRONMENT

Published by the Faculty of Engineering, University of Maiduguri, Nigeria

## Editorial Board

Prof. Ndubisi A. Aviara  
Dr. B. S. Waziri  
Dr. M. B. Oumarou  
Prof. Eli Mamman  
Dr. B. Gutti  
Dr. A. M. Kundiri  
Dr. C. U. Ngene  
Dr. B. U. Musa  
Prof. M. H. Badau  
Prof. A. T. Abdulrahim  
Prof. A. F. Alonge  
Dr. Klein E. Ileleji  
Dr. Alireza Heidari

Editor-in-Chief  
Deputy Editor-in-Chief  
Business Manager  
Associate Editor  
Associate Editor  
Associate Editor  
Associate Editor  
Associate Editor  
Associate Editor  
Associate Editor  
Associate Editor  
Associate Editor

## Editorial Assistants

- (1) Engr. A. A. Lawal (Administration)
- (2) Engr. P. Y. Dibal (Publication)
- (3) Engr. S. K. Oyeniyi (Webmaster)

All correspondences should be addressed to:

The Editor-in-Chief,  
AZOJETE,  
Faculty of Engineering,  
University of Maiduguri,  
Borno State, Nigeria.

or

e-mail: [azojete@gmail.com](mailto:azojete@gmail.com), [editor@azojete.com.ng](mailto:editor@azojete.com.ng)

© Faculty of Engineering, University of Maiduguri, Nigeria, 2017

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the copyright owners: Faculty of Engineering, University of Maiduguri, P.M.B. 1069, Maiduguri, Nigeria.

## From the Editor's Desk

We are happy to announce the publication of Volume 13(6), December, 2017 of our Journal. The issue showcases articles from the fields of Agricultural and Biological Engineering, Electrical and Electronic Engineering, Mechanical Engineering and Civil Engineering. Contributors from other Engineering fields, investigators working in the Energy field and those providing solutions to problems arising from global warming, desertification and flood control, as well as researchers in the fields of Science, Technology and Environment are hereby encouraged to submit their articles to the Journal. The AZOJETE website: <http://www.azojete.com.ng> has been upgraded to serve you better. We encourage our Readers and Contributors to visit the website and read and download articles since our Journal is operating on Open Access.

We thank all authors and the diverse team of specialist reviewers for their contribution to this Edition, and look forward to a continuing process of bringing you articles showcasing research at the leading edge of our subject focus (as they emerge globally) in every succeeding Volume and Issue of AZOJETE.

At the moment, articles are already being assessed for Volume 14(1), March 2018. We have continued to improve on our indexing status and are present now in several Scientific Data bases.

Thank you.

A handwritten signature in blue ink, reading "Ndubisi A. Aviara", with a stylized flourish underneath.

Prof. Ndubisi A. Aviara  
(Editor-In-Chief)

# ARID ZONE JOURNAL OF ENGINEERING, TECHNOLOGY AND ENVIRONMENT

*Volume 13 No. 6 December, 2017*

## **Scope**

Arid Zone Journal of Engineering, Technology and Environment (AZOJETE), published annually, is an interdisciplinary Journal covering all aspects of engineering, technology and environment with particular reference to the arid regions of the world.

## **Annual subscription excluding postage**

Copies	Nigeria	Overseas
1 - 9	N3,000.00 each	\$25.00 each
10 or more	N2,500.00 each	\$20.00 each

Postage shall be charged separately at the current rates. Copies may be obtained from the Business Manager, AZOJETE.

AZOJETE charges as follows:

Upon submission of paper, the author is expected to pay a non-refundable processing fee of N5,000.00 only (Nigeria) or \$20.00 (Overseas) per paper.

Publication charge per accepted paper is N15,000.00 (Nigeria) and \$100.00 (Overseas)

Corresponding author will receive a copy of the Journal and can download as many copies of paper as needed from our web site.

## **Instruction to contributors**

Arid Zone Journal of Engineering, Technology and Environment (AZOJETE) welcomes contributions in the form of original research papers (theoretical and experimental), book reviews as well as short communications from all parts of the world, with particular reference, but not exclusive, to arid regions. Submission of an article is based on the understanding that it has not been published elsewhere, or under consideration in any other journal. All contributions will be critically reviewed by expert referees on whose advice the Editorial Board will accept, reject or return articles to authors for modification or revision. Articles should be typewritten double-spaced on one side of A4 paper in Microsoft Word. Tables and figures should come immediately after being cited in the text.

## **Arrangement**

Papers should normally be divided into Abstract, Introduction, Materials and Methods, Results and Discussion, Conclusion, Acknowledgements (if any) and References. The title should be concise and informative. Name(s) and affiliations of authors should be provided. Where there is more than one author, the correspondence author should be indicated.

The abstract should not be more than 350 words and should state clearly the objective(s) of the study, a concise description of the experiment(s), major observations, results and

conclusions. The Harvard system of referencing should be used and the references listed alphabetically at the end of the paper. The following format should be used for journal articles, books and chapters in books, reports, conference proceedings and from the internet respectively:

Umar, B. 1997. The role of public and private tractor hiring units in agricultural mechanization - a case study from Adamawa state, Nigeria. *Outlook on Agriculture*, 26(1): 35-38.

Phillips, RE. 1981. *Farm Buildings – From Planning to Completion*. Doane – Western, Inc. St. Louis, Missouri.

Kirkby, MJ. 1980. Modelling water erosion processes. In Kirkby, M.J. and Morgan, R.P.C. (eds), *Soil erosion*, pp. 183-216, Wiley, Chichester.

Yang, Q. 1991. Blemish detection in fruit and vegetable grading with computer vision. Divisional Note DN 1610. Silsoe: Silsoe Research Institute.

Keating, BA., Wafula, BM. and Watiki, JM. 1992. Development of a modelling capability for maize in semi-arid eastern Kenya. In: Probert, M.E. (ed ). *A search for strategies for sustainable dryland cropping in semi-arid eastern Kenya*. Proceedings of a symposium held in Nairobi, Kenya, 10 - 11 December 1990. ACIAR proceedings no. 41, 138p.

Wallace, TB. and Cox, WE. 2002. Locating information on surface water availability in Virginia. <http://www.rapriverbasin.va.us/studies/locatingsurfacewaterinfo.doc> accessed on 10 October, 2004.

# ARID ZONE JOURNAL OF ENGINEERING, TECHNOLOGY AND ENVIRONMENT

*Volume 13 No. 6 December, 2017*

## Contents

Profiled Deck Composite Slab Strength Verification: A Review <i>K. Mohammed, I. Abd Karim, K. Bulu</i> .....	655-661
Design Description of a Tentacle Based Scanning System <i>M. O. Afolayan</i> .....	662-670
Equilibrium and Kinetic Studies of Adsorption of Safranin-O from Aqueous Solutions using Pineapple Peels <i>M. A. Mohammed, B. S. U. Ibn Abubakar, B. B. Kurna</i> .....	671-687
Particle Swarm Optimization (PSO)-Based Distributed Power Control Algorithm for Wireless Radio Systems <i>M. Abdulkadir, Z. M. Gwoma, A. B. Buji</i> .....	688-700
Comparative Evaluation of ANN and LMS Based Algorithms for Adaptive Noise Cancellation <i>A. A. Abdulrazaq, A. A. Ismail, D. Mustapha, A. M. Aibinu</i> .....	701-709
Modeling and Simulation of Pyrolysis Process for a Beech Wood Material <i>I. M. Idriss, M. M. Ahmed, A. S. Grema, D. Baba</i> .....	710-717
Evaluation of Chemical and Physico-Mechanical Properties of Ado-Ekiti Natural Moulding Sands for Foundry Applications <i>Y. L. Shuaib-Babata, A. J. Abegunde, I. O. Ambali</i> .....	718-733
Compressive Strength of Concrete made from Natural Fine Aggregate Sources in Minna, Nigeria <i>M. Abdullahi, A. Yakubu, J. I. Aguwa</i> .....	734-742
Development of Farm Records Software <i>M. S. Abubakar, A. B. Ahmad</i> .....	743-763
An Investigation into the Effectiveness of Machine Learning Techniques for Intrusion Detection <i>E. G. Dada, J. S. Bassi, O. O. Adekunle</i> .....	764-778
Comparism of the Properties and Yield of Bioethanol from Mango and Orange Waste <i>M. B. Maina, F. A. Oluwole, G. M. Ngala, S. A. Abdulrahman</i> .....	779-789
Algorithm for the Dynamic Analysis of Plane Rectangular Rigid Frame Subjected to Ground Motion <i>H. O. Ozioko, E. I. Ugwu</i> .....	790-800

Security Architecture for Thin Client Network <i>O. A. Okunade</i> .....	801-809
Anaerobically - Composted Environmental Wastes as Organic Fertilizer and Identification of the Associated Fungal Colony <i>S. O. Dania, C. Obigho, M. I. Dania</i> .....	810-816
Job Safety Assessment of Woodwork Industry in the South-western Nigeria <i>H. O. Adeyemi, O. A. Olatunji, O. O. Martins, O. O. Akinyemi, O. O. Adama, K. O. Alao</i> .....	817-830
Development of Inundation Map for Hypothetical Asa Dam Break using HEC-RAS and ARC GIS <i>O. S. Balogun, H. O. Ganiyu</i> .....	831-839
Artificial Neural Network Modelling of the Energy Content of Municipal Solid Wastes in Northern Nigeria <i>M. B. Oumarou, S. Shodiya, G. M. Ngala, M. A. Bashir</i> .....	840-847
NOx Emission in Iron and Steel Production: A Review of Control Measures for Safe and Eco-Friendly Environment <i>U. A. Mukhtar, A. M. El-jumma, M. D. Mohammad</i> .....	848-857
A Review of Smart Grids Deployment Issues in Developing Countries <i>A. O. Otuoze, A. M. Usman, O. O. Mohammed, A. A. Jimoh</i> .....	858-867
Inundation and Hazard Mapping on River Asa, using GIS <i>O. S. Olaniyan, O. M. Olaniyan, I. A. Azeez, A. S. Akolade</i> .....	868-877
Optimization of Mechanical Expression of Castor Seeds Oil ( <i>Ricinus communis</i> ) using Response Surface Methodology <i>J. O. Olaoye, R. A. Busari</i> .....	878-887